Communication Solutions
A Rockwell Collins Business

CS-5998/99
ULTRA-BROADBAND TUNERS

- ***1.5-18 GHz CF Tuning Range***
- ***10 kHz Tuning Resolution***
- ***2 GHz Bandwidth IF Output***
- ***3 GHz CF IF Output***

The CS-5999 is a 2 GHz bandwidth set-on Microwave Tuner covering the 1.5-18 GHz frequency tuning range with the edges covering the 0.5-19 GHz frequency range. It has low Noise Figure, high dynamic range, and low phase noise. The 2 GHz bandwidth, centered at 3 GHz, provides the user the opportunity to look at an ultra-wide IF anywhere in the microwave range.

The CS-5999 uses the same microprocessor control, frequency reference and other primary components as the popular CS-5040 Tuner, thus minimizing cost and simultaneously providing the reliability and performance of the CS-5040. The CS-5998 housing is primarily the same as a CS-5020C Microwave Receiver in a rack mount case.

The IF spectrum is inverted across the entire band to obtain the best spurious performance. Local Oscillator re-radiation is very low, and filters are designed for low group delay and minimum ripple. The CS-5999 uses switched pre-selection and fundamental mixing. Typical tuning resolution is 10 kHz, although it can be provided down to 100 Hz tuning resolution.

The CS-5999 appears the same as a CS-5040VXI case as shown above.

The CS-5998 is the same package and control panel as shown in the CS-5020C Receiver to the left.

The CS-5998 rack mount tuner can be provided with internal FM demodulation and Ultra-wide LOG video outputs as an option. It can also be provided with frequency extension capability, allowing the user to add milli-meterwave downconverters.

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In addition to the VXI interface control, the CS-5999 can be driven by an RS-232 interface, providing extra flexibility for new system requirements. It also serves as an easy port for service and testing.

The internal synthesizer is very low phase noise and is locked to an internal crystal reference. The internal reference automatically locks to an accurate external 10 MHz reference. The internal reference can be updated automatically upon command, when an accurate reference is applied.

The CS-5999 is housed in a shielded 3 slot VXI case as shown in the picture above. It is powered from the VXI interface in the same manner as the CS-5040 Tuner. Cooling is also provided through the VXI rack.

RELATED INSTRUMENTS

CS-5040VXI Tuner 0.1-22 GHz
CS-5111 VME Tuner
CS-5072 Ultra-Wide Demodulator

OPTIONS

A number of options are available, as listed below. Consult with Communication Solutions (Com-Sol) for option compatibility.

Option 1 – IF Output Frequency Change – contact factory

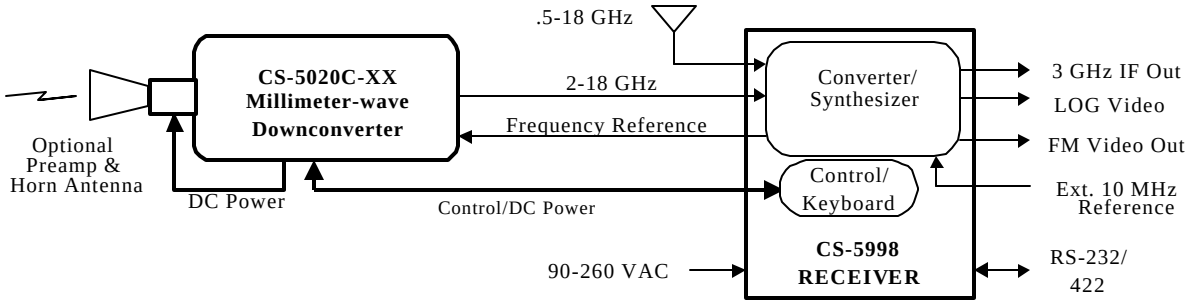
Option 2 – Front Panel (CS-5998 only)

Option 3 – Digital Interfaces - Contact Com-Sol for others. – (CS-5998 only)

3a – IEEE-488
3b – Ethernet (10Base-T)
3c – RS-232 PC compatible
3d – RS-485

Option 4 – LOG Amplifier and Discriminator (CS-5998 only)

Option 5 – Frequency Extension - Adds the interfaces to connect millimeter-wave downconverters. The diagram below shows a typical frequency extension configuration.



Simplified Block Diagram

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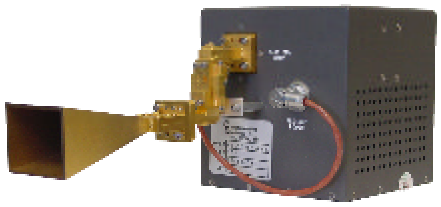
Millimeter-wave downconverters are small modules that are connected to the CS-5998 via two coaxial cables and a control/power cable. This allows a downconverter to be located near the antenna, which avoids the use of longer cables or difficult waveguide runs that could degrade the signal. A preamplifier can be connected directly to the downconverter, with power routed through the downconverter from the receiver via an external power cable.



The CS-5998 uses direct frequency commanding for operation in the millimeter wave bands. For example, if the operator requires the tuner to be set to 39.7525 GHz, the direct frequency of 39.7525 GHz would be commanded to the tuner. Algorithm or look-up table conversions are not required to be performed by the operator for millimeter wave operation.

Options 6-8 NA

Option 9 – RF Input Blanking/Attenuator (CS-5998 Only)

9a – Two RF blanking inputs with polarity selection
9b – 70 dB RF attenuator, in 10 dB steps

Option 10 & 11 – NA.

Option 12 - Extended Warranty – Contact Com-Sol for details.

SPECIFICATIONS

RF Input Frequency	1.5-18 GHz Center Frequency
Tuning Time	10 ms typical, 15 ms maximum
IF Output:	
Center Frequency	3 GHz (inverted spectrum)
Bandwidth	2 GHz
Noise Figure	12 dB typical, 15 dB maximum to 17 GHz, 17 dB to 18 GHz
Input Third Order Intercept.....	0 dBm typical, -2 dBm minimum
RF-IF Gain	15 dB minimum
External Reference	10 MHz, 0 dBm $\pm$ 3 dB minimum: auto-switching
Phase Noise	0.5 degrees rms, SSB typical
Connector Types:	
RF Input Connectors	"K" Female
IF Output Connectors	SMA Female
Video Output Connectors	BNC Female

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LOG Video Output: (Option 4)

Dynamic Range	50 dB minimum
Video Bandwidth	50 MHz typical
Video Output Level	0 to 2 volts, 75 ohms for 50 dB dynamic range
Response Linearity	± 1 %
Video Risetime	10 ns maximum

FM Video Output: (Option 4)

Video Bandwidth	50 MHz typical (Option 4)
Video Output Level	-2 to +2 for +1 GHz to -1 GHz from center
Linearity	± 3% over 80 % of band, ±5% for full bandwidth
Video Risetime	10 ns maximum

Instrument Control:

CS-5999	VXI (standard) / RS-232 (optional)
CS-5998	RS-232 (standard) / IEEE-488, Ethernet, RS-485 (optional)

Operating Temperature	0 to 50°C

Size:

CS-5998	3.5 x 8.5 x 21 in (8.9 x 21.6 x 53.3 cm), excludes handles and connectors
CS-5999	3 "C" Slot VXI

Weight:

CS-5998	8.2 kg (18 pounds) typical
CS-5999	7.25 kg (16 pounds) typical

Power Consumption	100 watts typical

ORDERING INFORMATION

When placing an order, please specify the exact model and options. Each unit is supplied with a power cord (CS-5998), a manual, a certificate of conformance, and acceptance test data.

All exports of the hardware and/or software referenced in this datasheet require a United States Department of State Export License, or exemption as regulated by the International Traffic in Arms Regulations (ITAR).

WARRANTY

Communication Solutions is an ISO-9001 certified Engineering and Manufacturing facility serving the Signal Intelligence Community and the Test & Measurement Industry.

All units are warranted for a period of one year against manufacturing defects in materials or workmanship, provided that the unit is returned to the manufacturer's designated facility. This warranty is specifically limited to the repair or replacement of the unit, and does not include liability for consequential damages or physical damage caused by other parties.

Communication Solutions reserves the right to change the features and/or specifications of the equipment described in this document at any time without notice.

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